Office of Indian Energy and Economic Development
U.S. Department of the Interior
Assistant Secretary - Indian Affairs
Division of Energy and Mineral Development

Native American Energy and Mineral Institute Educational Services

Course Overviews

NAEMI

Native American Energy and Mineral Institute

WHAT IS NAEMI
The Native American Energy and Mineral Institute (NAEMI) is a program offered by The Department of the Interior, Office of Indian Energy and Economic Development, which provides a series of short courses covering the fundamentals of energy and mineral resource development on Indian lands. These courses are designed for Tribal and BIA personnel who manage energy and mineral projects but lack some of the technical knowledge concerning development. We invite all Tribal members and BIA personnel to attend these short courses offered by the Native American Energy and Mineral Institute.

WHO SHOULD ATTEND
These courses are open to all tribal and BIA personnel who are involved with energy and mineral planning and development on Indian lands. These short courses will typically be of benefit to individuals in energy, mineral resource, environmental, business development, and education departments. These courses can benefit personnel interested in developing energy and mineral resources on tribal lands and enhance the income and employment opportunities that accompany responsible, environmentally sound development.

WHERE COURSES ARE HELD
Courses will be held at various locations to be announced at a later date. Courses run from 8:30 am to 4:30 pm daily. These classes are offered free of charge for Tribal members and BIA employees. Travel and per diem are the individual's responsibility. Individual class announcements will be mailed before the start date of each course with information on registration, date, time, and location.

Welcome

Dear Tribal Colleagues,

It is my pleasure to invite you to attend our Native American Energy and Mineral Institute (NAEMI) training program. This program is created especially for tribal and BIA personnel who staff and manage tribal energy (both renewable and non-renewable) and mineral programs on reservations. This is an opportunity to learn and share with others in technical and management positions who have responsibilities for developing tribal natural resources across Native America.

The mission of the NAEMI training program is to help you better understand the processes of energy and mineral development, and to gain valuable knowledge and skills concerning the environmental and business aspects associated with these technologies. You will come away with a broader understanding of the rapidly evolving energy and mineral industries and be better equipped to meet the expectations of your tribal leaders.

We look forward to seeing you at one of our training events.

Sincerely

Robert W. Middleton, PhD.
Director
OFFICE OF INDIAN ENERGY AND ECONOMIC DEVELOPMENT

(Dates and Times to be Announced)

General Studies Course Descriptions

Gen 101 - Business Models for Energy and Mineral Project Development

Course Length: 32 hrs

This workshop will focus on various options and strategies for moving energy and other types of projects forward. Participants will gain a better understanding of the kinds of business structures that can best meet their economic development needs. The course will start by contrasting the differences in businesses operated by tribal political entities to ventures operated by a tribal corporation. This discussion will focus on maintaining income and jobs for future generations, and creating a business plan

Gen 102 - Project Management I

Course Length: 32 hrs

This course will provide the participants with a background into creating a profitable Tribal company, including what is required to develop a concept through the completion of a project. The course will assist with the decision making process and help the participants with the ability to get a project to a profitable operation. The creation and benefits of a Tribal Corporation, separate from the Tribal Government & Business Council will be discussed. Tribal energy (conventional and renewable) and mineral resources will be discussed and potential options for using these resources will be reviewed. Methodology required for a feasibility study and the possible risks involved will be covered.The course will discuss basic concepts that apply to all energy and mineral development such as: feedstock, storage, transmission access, cogeneration/back-up systems, transportation, and markets.

Gen 103 - Economics

Course Length: 32 hrs

The economics course will emphasize economic definitions, vocabulary and the analysis of properties to help determine the possible future revenues that could be expected for a project. Mineral leases will be discussed to provide an understanding of the terms and potential options available. Risk and possible risk minimization solutions will be covered during the course. Various types of financing will be covered and cash flow models will be developed. Special topics such as tax considerations, risk analysis, inflation, escalation factors, depreciation and capital amortization determinations will be added to evaluation techniques. Business structures available to tribes to place a property in production are outlined. Basic financial concepts such as cash flow and the time value of money are defined.Economic evaluation techniques will be described with emphasis placed on the discounted cash flow rate of return method. The participants will be able to understand economic evaluation at the conclusion of this course.

Gen 104 - NEPA

Course Length: 24 hrs

This course will review various Federal and State regulations affecting energy and mineral development, with a special focus on Indian energy and mineral development. Environmental policies and procedures which require specific actions on Indian lands will also be covered. Federal and State regulations will be covered during this course and will be reviewed with respect to their impact on the development of tribal resources.

Gen 105 - National Indian Oil & Gas Evaluation and Management System: NIOGEMS

Course Length: 16 hrs

This course will train the user in the full use of the NIOGEMS system. This system consists of a "Data Viewer" for viewing tabular and descriptive information, and a "Map Viewer" for viewing mapped information. The course will cover the data content stored in NIOGEMS, i.e., well attributes, oil and gas production, lease and agreements, ownership, and other reservation related map information. Prior to or following completion of the NIOGEMS course, the NIOGEMS system will need to be installed at the users' location.

Gen 106 - Introductory Geology

Course Length: 32 hrs (1.5 day intro with following 2.5 days broken down between a Petroleum emphasis and a Solid Mineral emphasis; students will chose between the two options)

Basic Geology - Course Length: 12 hrs

This course will provide a primer on the basics of geology. The basic course will discuss topics including the origin of the earth, the geologic time scale, basic rock types and their origin, geologic mapping, mountain building processes, overview of structural geology, basic topological and geological mapping, and other information to be utilized in future courses. This part of the geology short course provides the basic knowledge required for understanding the concepts presented in many of the courses that follow in the NAEMI curriculum.

Introductory Geology - Petroleum Emphasis

Course Length: 20 hrs

This course will discuss the processes governing the origin, generation and accumulation of hydrocarbon. Emphasis will be placed on the structural side of geology. An overview of the processes involved in the creation and deposition of sediments and their evolution into petroleum reservoirs will be introduced along with modern analogs the student may be familiar with. With this knowledge, the discussion will turn to trapping mechanisms with the concepts of structure, seals, unconformities, and unconventional accumulations such as coal bed methane and tight gas sands. Finally, the student will be exposed to oil and gas field mapping, cross sections, exploration, followed by a brief introduction to well logging and testing. Included in the class will be a field trip to observe in the field some of the topics discussed in the class.

Introductory Geology - Solid Mineral Emphasis

Course Length: 20 hrs

Elements of economic geology are studied, including the types of deposits that are mined for different products and how they occur. Various exploration techniques are described. Classifications of resources and reserves are defined and the techniques of reserve estimation are discussed. One day is a field trip during which some of the geologic features described in the basic geology portion of the course are observed in nature.

Oil, Gas and Fluids Course Descriptions
Introduction and Guidelines

With current oil prices reaching $60 per barrel and natural gas above $6 per thousand cubic feet, there is renewed desire for exploration and petroleum production in the United States. Indian lands are attractive to exploration companies because of the large potential for sizable reserves on contiguous acreage blocks. In general, a majority of the reservations are lightly explored, and the oil and gas industry is taking note.

Oil & Gas 201 - Petroleum Operations I

Prerequisites: Gen 106 - Oil and Gas Emphasis
Course Length: 32 hrs
This course will cover major aspects of petroleum operations, taking a geological prospect from inception through the abandonment of the well after the well is no longer economic. The course will cover the leasing of the land, both Fee and Tribal leases, the permit requirements comparing Federal and State processes for a well, and the overall field planning and how good planning can reduce problems in the future. The course will develop the well design and plan the drilling process giving the participants a good background on various methods used in the petroleum business

Oil & Gas 202 - Environmental Compliance in the Petroleum Industry

Prerequisites: Gen 106 - Oil and Gas Emphasis
Course Length: 32 hrs
This class will focus not only on compliance and remediation, but delve into the history and nuances of the Clean Water Act, National Environmental Policy Act, Clean Air Act, resource conservation and Recovery Act, Comprehensive Environmental Response Compensation and Liability Act, and the Safe Drinking Water Act. Governmental agencies such as OSHA, the EPA and local emergency response roles are examined in the class. A field trip will be part of the class.

Oil & Gas 203 - Petroleum Geology II

Prerequisites: Gen 106 - Oil and Gas Emphasis
Course Length: 32 hrs
With a basic geologic understanding, the Petroleum Geology II course will further examine the petroleum reservoir by discussing the concepts of porosity development, permeability, reservoir energy and the interaction of fluids in the reservoir. The concept of measuring these parameters via well logs, cores, core analysis, and drill stem testing will be introduced, volumes will be calculated and various types of maps and displays created. Depositional environments and Exploration techniques for reservoir and trap identification will be addressed by discussions on gravity and magnetic surveys followed by prospecting with geophysical methods. A field trip will be included in the course work.

Oil & Gas 204 - Management of Petroleum Properties

Prerequisites: Gen 106 - Oil and Gas Emphasis
Course Length: 32 hrs
This course will develop the techniques for estimating potential hydrocarbon reserves and forecasting production rates for a project. Properties of the rock and fluids in the reservoir will be defined. The different types of petroleum reservoirs will be discussed along with various forecasting methods, recovery methods, completion techniques, production, and water issues. The course will conclude with available software that could be purchased to analyze hydrocarbon reservoirs.

Oil & Gas 205 - Petroleum Economics II

Prerequisites: Gen 103, Gen 106 - Oil and Gas Emphasis, O&G 204
Course Length: 32 hrs
This course expands and elaborates on economic evaluation techniques and terminology learned in Petroleum Economics I. The capital financing spectrum will be discussed along with mineral leasing, economic evaluation and other topics such as tax considerations, risk analysis, inflation, escalation factors, depreciation and capital amortization. The course will conclude with a class project which will utilize geology, engineering and economic methods to evaluate and determine the best possible hydrocarbon project for a Tribal to proceed with as an investment.

O&G 206 - Petroleum Applications and Field Studies

Prerequisites: Gen 106 - Oil and Gas Emphasis, O&G 203 and O&G 205
Course Length: 24 Hours
This class will focus on a series of case studies of a variety of exploration and development scenarios. The students will be asked prior to the class to submit an oil or gas exploration or production topic pertinent to their Reservation for analysis by the instructor and class. The concept will be to discuss the history of the field, consider the geological and financial risk, contrast different exploration methods, and different out comes.

Oil & Gas 207 - Geothermal

Prerequisites: Gen 106 - Oil and Gas Emphasis
Course Length: 32 hrs
The geothermal workshop will cover both geothermal steam for power production, district community heating, commercial thermal, and geothermal heat pump applications. Workshop will cover: technology status, industry development status, market opportunities, challenges, project economics, and will include a site visit as appropriate and logistically reasonable.

Solid Mineral Resource Development Course Descriptions Introduction and Guidelines

The mining short courses in the Native American Energy and Mineral Institute program are designed for those tribal members who wish to gain a general knowledge of the geology, mining, economics, and other important issues of specific mineral commodities. Coal and aggregates have been treated separately because those two are currently the most important solid mineral deposits on Indian reservations. In addition, mining methods, processing, and product sales are different compared to metallic and other non-metallic operations.

MRD 201 - Coal Mining

Prerequisite: Gen 106 - Introductory Geology - Solid Mineral Emphasis
Course length: 32 hours
The course begins with the origin, formation, and locations of coal deposits. Classifications of coal types and the various uses of coal are discussed. The properties of coal and laboratory tests are examined. Surface and underground mining methods are described. Problems sometimes associated with coal mining, such as subsidence and acid mine drainage, are discussed, together with remedial measures and reclamation. Coal preparation, transportation, and the marketing of coal are also covered in the course. A one-day field trip to one or two operating coal mines is included in the course.

MRD 202 - Aggregate Mining

Prerequisite: Gen 106 - Introductory Geology - Solid Mineral Emphasis
Course length: 32 hours
Sand & gravel and crushed rock are the aggregates covered in the course. The various uses of aggregate are discussed and exploration methods are described. Aggregate testing techniques are then examined. The mining and processing of aggregates are studied with particular emphasis on the types of products produced. Transportation of aggregates is examined from the viewpoint of the impact on sales. The course concludes with the all-important topic of the marketing of aggregate products. A one-day field trip to selected aggregate operations is part of the course.

MRD 203 - Metal, Non-Aggregate Industrial Mineral, and Gemstone Mining

Prerequisite: Gen 106 - Introductory Geology - Solid Mineral Emphasis
Course length: 32 hours
This course covers the mining of mineral deposits other than aggregates or coal. The course begins with a listing of the various types of ores that can be mined and a general description of mining methods. This is followed by a discussion of mine planning, surface and underground mining methods. In the surface mining category, open pit mining is discussed in some detail. A variety of ways to access deposits and a number of underground mining methods are described. The course concludes with the processing of ores, the products produced, and how they are sold. There will be a one-day field trip to a mine as part of the course.

MRD 204 - Mine Project Analysis and Economic Evaluation

Prerequisite: Gen 106 - Introductory Geology - Solid Mineral Emphasis - Course length: 32 hours
The course begins with a discussion of the three basic types of studies employed in the mining industry: the evaluation study, the intermediate economic or prefeasibility study, and the feasibility study. The components of the feasibility study, business structures and basic financial concepts such as cash flow and the time value of money are defined. Economic evaluation techniques will be described with emphasis placed on the discounted cash flow rate of return method.

MRD 205 - Mine Environmental Issues and Permitting

Prerequisite: Gen 106 - Introductory Geology - Solid Mineral Emphasis
Course length: 32 hours
The course begins with a brief overview of various surface and underground mining methods. The types of pollutants from mines, how they are produced and the effects on humans, animals, and plant life are discussed. Remedial measures, mine waste treatment techniques, and the history of environmental legislation will be reviewed. The final section of the course will deal with mine permitting. A list of the Indian reservation-specific permits required, government agencies responsible and the differences between permitting coal and non-coal mines will be outlined. There will be a one-day field trip to reclaimed mining areas in the metro area.

Renewable Course Descriptions
Introduction and Guidelines

Renewable energy relies on the natural flow of wind, running water, sunshine, and earth's heat. Energy efficiency is the practice doing more with less energy. These concepts have always been a part of the traditional way of native peoples. Tribes today are seeking ways to develop their communities based on sound, long term sustainable practices. Renewable energy and energy efficiency offer the prospect of a sustainable energy future with important links to the past. Sustainable resource development will be an underlying basis for all of the renewable courses. There are no prerequisites for any of the renewable courses.

Renew 201 - Wind Power

Course Length: 40 hrs
This workshop will cover major aspects of wind technology feasibility assessment and project development including: resource assessment, turbine technology, industry status and available turbines, project developers, market opportunities, grid connection, and economics. The course will also touch on small turbine installations and hybrid power systems with a focus on retrofit of existing stand-alone diesel engines with parallel connection of wind turbines. The workshop will conclude with a site visit to the Ponnequin wind farm in northern Colorado. Participants will obtain a good understanding of wind power terminology and the challenges and opportunities to wind power development.

Renew 202 - Woody Biomass

2 day course to be held on a Tuesday and Wednesday (same week as Renew 203)
Course Length: 16 hrs
Focus for this class will be on Woody Biomass Utilization. The course includes woody biomass resource assessment, stewardship examples, and on going woody biomass project examples. A tour of Community Power Corporation, a manufacturer of small modular bio-power equipment will be included. Participants will obtain a good understanding of the diversity of woody biomass energy options (small scale and large scale), and the ability to identify possible resource options, technology pathways and partners for moving tribal projects forward.

Renew 203 - Liquid Fuel Biomass (January wk 3)

2 day course to be held on a Thursday and Friday (same week as Renew 202)
Course Length ; 16 hrs
An overview of the definition and basic principles of biomass utilization will be covered on the first morning with the focus of utilizing Biomass for liquid fuel generation and use to be covered for the next day and a half. The course will include biomass fuel resource assessment, and examples of on going biomass fuel project development activities. Participants will obtain a good understanding of the diversity of biomass fuel options (bio-oil, bio-diesel, ethanol, etc.) and the ability to identify possible resource options and technology pathways and partners for moving tribal projects forward.

Renew 204 - Small Scale Hydro Power

Course Length: 24 hrs

The small and micro hydroelectric workshop will cover hydropower resource assessment, provide examples of successful installations, review currently available commercial technology, development barriers, and project economics. A tour of the Waterton Canyon small hydro plant in Littleton, CO will be included if possible. Participants will leave with a good understanding of small/micro hydro power resource identification steps and the process for moving specific projects forward. (If there are interested parties present, those with water property, tidal and wave power generation will be discussed)

Renew 205 - Renewable Energy for Tribal Community Development

Course Length: 32 hrs

This course will contain a combination of lectures and working sessions. The objective is to have participants leave the course with a good understanding of the following: renewable energy and energy efficiency technology options, tribe specific renewable resources, how to evaluate the options, the importance of Tribal strategic energy planning, and the importance of organizational stability and leadership. This course will serve as the introduction to renewable energy and community renewable energy development.

Renew 206 - Solar Power PV and Domestic Hot Water

Course Length: 24 hrs

The Solar power workshop will discuss photo-voltaics, solar electrics and solar thermal domestic hot water technologies. The workshop will cover: technology status, industry development status, market opportunities and challenges, project economics, and will include a site visit (NREL facility) as appropriate and logistically reasonable. Solar power on a small facility by facility scale is an excellent way to provide power and hot water to remote Tribal facilities. Applications such as this will be discussed.

Renew 207 - Geothermal - same as Oil & Gas 207

Prerequisites: Gen 106

Course Length: 24 hrs

The geothermal workshop will cover both geothermal steam for power production, district community heating, commercial thermal, and geothermal heat pump applications. Workshop will cover: technology status, industry development status, market opportunities and challenges, project economics, and will include a site visit as appropriate and logistically reasonable.

Renew 208 - Renewable Energy Economics and Marketing

Course Length: 32 hrs

Economic assessment of renewable power is becoming common place and necessary to fully understand the dynamic time-varying nature of these projects. Economics of stand-alone and grid connected renewable energy projects will be discussed. Models will be discussed that can assist with understanding the economics of a wide array of distributed and hybrid generation technology options. The exciting market for Renewable Energy Credits will also be discussed to see how Tribes can benefit from the sale of their RECs. With many States creating Renewable Portfolio Standards (RPS) the renewable power market is growing. The renewable power market will be discussed and ways for Tribes to benefit will be covered.

SHORT COURSE TECHNICAL SUPPORT

Assistant Secretary-Indian Affairs:
Division of Energy and Mineral Development
12136 W. Bayaud Ave Suite 300
Lakewood, Colorado 80228

Colorado School of Mines:
Department of Continuing Education
1600 Arapahoe St Golden, Colorado 80401

National Renewable Energy Laboratory
1617 Cole Boulevard Golden, Colorado 80401